

CLAIMS

What is claimed:

- 1 1. A virtual storage system for mapping virtual storage segments of
2 differing sizes to storage locations, comprising:
3 an agent coupled to the host, the agent having volatile memory for
4 storing a first table, the table having entries to map the virtual storage
5 segments to the storage locations; and
6 a controller coupled to the agent, the controller having non-volatile
7 memory for storing a second table, the controller intermittently causing
8 contents of the first table to be replaced by contents of the second table,
9 whereby during an input/output (I/O) operation, the host accesses
10 one of the entries in the first table to determine one of the storage
11 locations.
- 1 2. The system of claim 1, wherein the second table identifies an
2 alternate storage location within the storage locations.
- 1 3. The system of claim 2, wherein the second table further includes a
2 bitmap that having entries that correspond to blocks of data stored within
3 the alternate storage location.
- 1 4. The system of claim 1, further comprising an alternate storage
2 container comprising alternate storage locations of the storage location
3 correlating to the virtual storage segments.
- 1 5. The system of claim 4, wherein an I/O operation accesses
2 information on both the storage location and the alternative storage
3 location.
- 1 6. The system of claim 5 wherein a bitmap designates blocks at the
2 alternative storage location to use for the I/O operation.

1 7. A system for mapping a virtual disk segment to a storage location
 2 within a storage device, such that a host queries said system to determine
 3 said storage location for input/output operations, said system comprising:
 4 a first table having a first table entry mapping the virtual disk
 5 segment to the storage location;
 6 a second table having a second table entry corresponding to said
 7 storage location and to an alternate storage location, and block bitmap
 8 information identifying blocks of data having differing sizes within the
 9 alternate storage location;
 10 a plurality of variables indicating states of the entry;
 11 an offset for the entry, wherein the offset includes a logic unit
 12 number identifier and a block identifier;
 13 a first memory to store the first table and
 14 a second memory to store the second table.

1 8. The system of claim 7, wherein said first memory is a volatile
 2 memory.

1 9. The system of claim 7, wherein said second memory is a non-volatile
 2 memory.

1 10. The system of claim 7, wherein the states include a no-write state.

1 11. The system of claim 7, wherein the states include an error state.

1 12. A method for performing an input/output operation on a virtual
 2 storage segment defined by a first table that maps the storage segment to
 3 a first storage location, the method comprising:
 4 turning off input/output operations at the first storage location;
 5 identifying portions of the virtual storage segment to be effected
 6 during the write operation;

7 storing a record of the identified portions at a second table and not
8 at the first table; and
9 writing to a second storage location, whereby the writing operation
10 occurs at portions of the second storage location associated with the
11 identified portions.

1 13. The method of claim 12, wherein the turning off step includes
2 activating an invalid state.

1 14. The method of claim 12, wherein a subsequent read operation for
2 the virtual segment occur at portions of the first storage location not
3 included in the identified portions and the portions of the second storage
4 location associated with the identified portions. .

1 15. The method of claim 14, wherein the first table is stored by an agent
2 and during the read operation, the record of the identified portions is sent
3 to the agent.

1 16. The method of claim 15, wherein the mapping between the virtual
2 storage segment and first storage location is contained in numerous first
3 tables, each of the first table stored by a different agent.